

Title (en)  
SEMICONDUCTOR DEVICE AND ITS MANUFACTURING METHOD

Title (de)  
HALBLEITERBAUELEMENT UND VERFAHREN ZU SEINER HERSTELLUNG

Title (fr)  
DISPOSITIF A SEMI-CONDUCTEUR ET PROCEDE DE FABRICATION ASSOCIE

Publication  
**EP 1315212 A4 20080903 (EN)**

Application  
**EP 01963539 A 20010907**

Priority

- JP 0107810 W 20010907
- JP 2000353700 A 20001121

Abstract (en)  
[origin: US2003020136A1] A DMOS device (or IGBT) includes an SiC substrate 2, an n-SiC layer 3 (drift region) formed in an epitaxial layer, a gate insulating film 6, a gate electrode 7a, a source electrode 7b formed to surround the gate electrode 7a, a drain electrode 7c formed on the lower surface of the SiC substrate 2, a p-SiC layer 4, an n+ SiC layer 3 formed to be present from under edges of the source electrode 7b to under associated edges of the gate electrode 7a. In addition, the device includes an n-type doped layer 10a containing a high concentration of nitrogen and an undoped layer 10b, which are stacked in a region in the surface portion of the epitaxial layer except the region where the n+ SiC layer 5 is formed. By utilizing a quantum effect, the device can have its on-resistance decreased, and can also have its breakdown voltage increased when in its off state.

IPC 8 full level  
**H01L 21/04** (2006.01); **H01L 29/739** (2006.01); **H01L 29/78** (2006.01); **H01L 29/08** (2006.01); **H01L 29/24** (2006.01); **H01L 29/36** (2006.01)

CPC (source: EP KR US)  
**H01L 21/18** (2013.01 - KR); **H01L 29/66068** (2013.01 - EP US); **H01L 29/7391** (2013.01 - EP US); **H01L 29/7395** (2013.01 - EP US); **H01L 29/7828** (2013.01 - EP US); **H01L 29/1608** (2013.01 - EP US); **H01L 29/365** (2013.01 - EP US)

Citation (search report)

- [Y] DE 19900169 A1 19990708 - FUJI ELECTRIC CO LTD [JP]
- [Y] EP 0309290 A1 19890329 - NEC CORP [JP]
- [A] DE 19640561 A1 19970417 - SAMSUNG ELECTRONICS CO LTD [KR]
- See references of WO 0243157A1

Citation (examination)  
TAKAHASHI K ET AL: "VERTICAL HOT-WALL TYPE CVD FOR SIC GROWTH", MATERIALS SCIENCE FORUM, AEDERMANNSTADT, CH, vol. 338-342, 1 January 2000 (2000-01-01), pages 141 - 144, XP008010071, ISSN: 0255-5476

Designated contracting state (EPC)  
CH DE FR LI SE

DOCDB simple family (publication)  
**US 2003020136 A1 20030130**; **US 6580125 B2 20030617**; CN 1173411 C 20041027; CN 1395746 A 20030205; EP 1315212 A1 20030528; EP 1315212 A4 20080903; JP 3773489 B2 20060510; JP WO2002043157 A1 20040402; KR 100454199 B1 20041026; KR 20020071954 A 20020913; WO 0243157 A1 20020530

DOCDB simple family (application)  
**US 20409702 A 20020815**; CN 01803862 A 20010907; EP 01963539 A 20010907; JP 0107810 W 20010907; JP 2002544789 A 20010907; KR 20027009350 A 20020720